REMARKS

The 10 February 2003 Office Action addressed claims 1 through 22. The written description has been amended to correct clerical errors. No new matter has been added. Claims 1-3, 5, 7, 14 and 20 have been amended. Claims 23-31 have been added. Claim 14 has been amended to correct a clerical error. Support for the amendments to claims 1-3, 5, 7, 14 and 20 and for new claims 23-31 may be found, *inter alia*, at pages 7 and 14 of the original specification and in FIGS. 7 and 8. Thus, claims 1-31 are in the present application.

In paragraph 2 of the instant Office Action the Examiner states that the listing of references in the specification is not a proper Information Disclosure Statement. The Examiner further states that the references cited in pages 7 and 8 of the specification must be included in an Information Disclosure Statement. Accompanying the present response is an Information Disclosure Statement including the references cited on pages 7 and 8 of the specification.

In paragraph 4 of the instant Office Action claims 1-3 stand rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent No. 3,728,622 to Williams (hereinafter "Williams").

The rejection is respectfully traversed for at least the following reasons.

Applicants' claim 1 has been amended to recite features that are patentably distinct from Williams. Claim 1, as amended, recites an electronic circuit for sensing an output of a sensor, the electronic circuit comprising, among other features:

"a substrate;

at least two electrode pairs formed on a first surface of the substrate for sensing a parameter, each electrode pair having a first electrode and a second electrode, wherein the

first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair".

Williams neither discloses nor suggests the claimed invention, including the above-quoted features.

Williams discloses a method and apparatus for measuring the ratio of the resistivity of a water saturated sediment to the resistivity of the interstitial water of the sediment. (See Abstract.) The apparatus disclosed by Williams includes an electrode arrangement "capable of being pulled across the bottom of the water such as a sled." The electrode arrangement (50) includes an insulated disk (51) and three electrodes (54, 56 and 57). Electrodes (56) and (57) are located on opposite sides of the insulating disk (51) such that they are opposed to each other. The electrode 54 is a metallic ring that surrounds the disk 51 and forms a rigid metal frame for stabilizing the sled 50. (See col. 6, lines 31-33, lines 54-56.)

Williams does not disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1. Furthermore, Williams does not disclose or suggest two pairs of electrodes, where each of the two pairs of electrodes has a first electrode that wraps at least partially around a second electrode.

Thus, there are features of applicants' amended claim 1 that are neither disclosed nor suggested by Williams. Therefore, claim 1, as amended, is for at least these reasons believed to be allowable.

Claims 2 and 3 depend directly or indirectly from claim 1 and are, for at least this reason, also believed to be allowable.

In paragraph 6 of the instant Office Action claim 4 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Williams in view of Kesphol (U.S. Patent No. 5,394,095) (hereinafter "Kesphol").

The rejection is respectfully traversed for at least the following reasons.

Applicants' claim 4 recites "[t]he electronic circuit of Claim 1, wherein a layout of the first electrodes and the second electrodes minimizes cross coupling between the first electrodes and the second electrodes."

Neither Williams nor Kesphol, alone or in combination, disclose nor suggest the claimed invention, including the above-quoted features.

Regarding claim 4, the Examiner recognizes that Williams does not expressly disclose that "the layout of the second electrode minimizes the cross coupling between the second electrode and the first electrode and the second electrode". Accordingly, the Examiner cited the Kesphol patent with respect to that feature. The Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teaching of Kesphol into Williams for the purpose of obtaining an accurate signal that is free of interferences."

Kesphol discloses a sensor device for a noncontact sensor for the control of moving strips of conductive material. (See Abstract.) The device includes electrodes (2), (4) disposed within shielding electrodes (3), (5). The C-shaped, shielded electrodes are disposed about a moving strip of conductive material (7). The shielding electrodes (3), (5) embrace the moving strip of conductive material (7) at a section of the moving strip that is arranged between two guide rollers (6). The electrodes are used to obtain information about lateral movement of the moving strip from its centered position between the two C-shaped electrodes. (See FIGS. 1-4; col. 3, lines 38-49.) However, Kesphol does not disclose or suggest that "at least two electrode pairs formed on a first surface of the

substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1.

Because applicants' claim 4 depends directly from claim 1, and because neither Williams nor Kesphol, alone or in combination, disclose or suggest that "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1, even if Kesphol and Williams could be combined as suggested by the Examiner, the combination would not meet the claimed invention. Thus, claim 4 would not have been obvious at the time the invention was made to a person having ordinary skill in the art. Thus, the Patent and Trademark Office has not made out a prima facie case of obviousness under the provisions of 35 U.S.C. 103(a).

In paragraph 7 of the instant Office Action claims 5-6 and 20-22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Williams in view of Schulman et al. (U.S. Patent No. 6,387,048) (hereinafter "Schulman").

The rejection is respectfully traversed for at least the following reasons.

Regarding claims 5-6 and 20-22, the Examiner recognizes that Williams does not disclose various features recited therein. Accordingly, the Examiner cited the Schulman patent with respect to these features. Regarding claims 5-6, the Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teaching of Schulman et al. into Williams for the purpose of setting a known reference voltage against which the voltages measured by the at least one electrode pair can be assessed." Regarding claims 20-22, the Examiner asserts that it would have been obvious to a person of ordinary

skill in the art "to combine the teaching of Schulman et al. into Williams for the purpose of monitoring a patients blood or other body-fluid characteristics."

Schulman discloses an implantable sensor that includes electronic circuitry for automatically performing specified integrity tests which verify proper operation of the sensor. (See Abstract.) Schulman teaches that a rate of the reaction is directly related to the concentration of glucose in the tissue and is monitored by an electrochemical oxygen detector including electrodes (W1), (R) and (C). (See FIG. 2A; col. 6, lines 53-57.) However, Schulman does not disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1.

Because applicants' claims 5-6 and 20-22 depend directly or indirectly from claim 1, and because neither Williams nor Schulman, alone or in combination, disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1, even if Schulman and Williams could be combined as suggested by the Examiner, the combination would not meet the claimed invention. Thus, claims 5-6 and 20-22 would not have been obvious at the time the invention was made to a person having ordinary skill in the art. Thus, the Patent and Trademark Office has not made out a prima facie case of obviousness under the provisions of 35 U.S.C. 103(a).

In paragraph 8 of the instant Office Action claims 7, 8, 10, 13 and 19 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Williams in view of Preikschat (U.S. Patent No. 3,992,665) (hereinafter "Preikschat").

The rejection is respectfully traversed for at least the following reasons.

Regarding claims 7, 8, 10, 13 and 19, the Examiner recognizes that Williams does not disclose various features recited therein. Accordingly, the Examiner cited the Preikschat patent with respect to these features. Regarding claim 7, the Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teaching of Preikschat into Williams for the purpose of making accurate measurements of sensed parameters." Regarding claim 8, the Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teaching of Preikschat into Williams and incorporate a counter and control logic in the circuit for the purpose of timing and controlling the measurements." Regarding claim 10, the Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teaching of Preikschat into Williams and incorporate a microprocessor in the circuit, for the purpose of automatic control of the sensing and for processing of the data sensed." Regarding claim 13, the Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teaching of Preikschat into Williams and incorporate a analog-to-digital converter in the circuit, for the purpose of further processing the data in a digital device such as a microcomputer." Regarding claim 19, the Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teaching of Preikschat into Williams and incorporate switched capacitors as resistors in the circuit for the purpose of sensitive control of bridge circuits for measuring small electrode voltages."

Preikschat discloses an apparatus for measuring the electrical impedance of a variety of materials. The apparatus includes an electrode arrangement (12) providing sample data to an impedance bridge. (See Abstract; FIG. 1.) However, Preikschat does not disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1.

Because applicants' claims 7, 8, 10, 13 and 19 depend directly or indirectly from claim 1, and because neither Williams nor Preikschat, alone or in combination, disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1, even if Preikschat and Williams could be combined as suggested by the Examiner, the combination would not meet the claimed invention. Thus, claims 7, 8, 10, 13 and 19 would not have been obvious at the time the invention was made to a person having ordinary skill in the art. Thus, the Patent and Trademark Office has not made out a prima facie case of obviousness under the provisions of 35 U.S.C. 103(a).

In paragraph 9 of the instant Office Action claims 9 and 18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Williams in view of Preikschat as applied to claims 7 and 8 and in further view of Schulman.

The rejection is respectfully traversed for at least the following reasons.

Applicants' claim 9 recites "[t]he electronic circuit of Claim 8, wherein the control logic comprises

a state machine; and

a state decoder connected to the state machine."

Applicants' claim 18 recites "[t]he electronic circuit of Claim 7, wherein the circuitry further comprises

a temperature sensor for reading a temperature of an environment; and

a voltage reference for applying a voltage to a reference electrode."

Neither Williams, Preikschat nor Schulman, alone or in combination, disclose nor suggest the claimed invention, including the above-quoted features.

Regarding claims 9 and 18, the Examiner recognizes that neither Williams nor Preikschat discloses various features recited therein. Accordingly, the Examiner cited the Schulman patent with respect to these features. Regarding claim 9, the Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teaching of Schulman into the circuit of Williams and Preikschat, and incorporate a state machine and a state decoder, for the purpose of ease of control of the tests by external command signals." Regarding claim 18, the Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teaching of Schulman into the circuit of Williams and Preikschat for the purpose of temperature compensation of any reading referenced to the reference voltage."

However, neither Williams, Preikschat nor Schulman, alone or in combination, disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1.

Because applicants' claims 9 and 18 depend directly or indirectly from claim 1, and because neither Williams, Preikschat nor Schulman, alone or in combination, disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1, even if Williams could be combined with Preikschat and Schulman as suggested by the Examiner, the combination would not meet the claimed invention. Thus, claims 9 and 18 would not have been obvious at the time the invention was made to a person having ordinary skill in the art. Thus, the Patent and Trademark Office has not made out a prima facie case of obviousness under the provisions of 35 U.S.C. 103(a).

In paragraph 10 of the instant Office Action claims 11 and 12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Williams and Preikschat as applied to claim 7 and in further view of Jones (U.S. Patent No. 4,533,986) (hereinafter "Jones").

The rejection is respectfully traversed for at least the following reasons.

Applicants' claim 11 recites "[t]he electronic circuit of Claim 7, wherein the rectifier transfers power from communication pulses to a capacitor."

Applicants' claim 12 recites "[t]he electronic circuit of Claim 11, wherein the capacitor powers the electronic circuit using power stored from the communication pulses."

Neither Williams, Preikschat nor Jones, alone or in combination, disclose nor suggest the claimed invention, including the above-quoted features.

Regarding claims 11 and 12, the Examiner recognizes that neither Williams nor Preikschat disclose various features recited therein. Accordingly, the Examiner cited the Jones patent with respect to these features. The Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teaching of Jones into the circuit of Williams and Preikschat for the purpose of supplying electrical power to the circuit."

Jones discloses a compact power supply which derives electrical energy from a low frequency medium voltage source and converts the electrical energy to a low voltage format suitable for solid state signal processing equipment. (See Abstract). However, Jones does not disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1.

Because applicants' claims 11 and 12 depend directly or indirectly from claim 1, and because neither Williams, Preikschat nor Jones, alone or in combination, disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1, even if Williams could be combined with Preikschat and Jones as suggested by the Examiner, the combination would not meet the claimed invention. Thus, claims 11 and 12 would not have been obvious at the time the invention was made to a person having ordinary skill in the art. Thus, the Patent and Trademark Office has not made out a prima facie case of obviousness under the provisions of 35 U.S.C. 103(a).

In paragraph 11 of the instant Office Action claims 14 and 15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Williams and Preikschat as applied to claim 7 and in further view of Gord et al. (U.S. Patent No. 5,999,848) (hereinafter "Gord").

The rejection is respectfully traversed for at least the following reasons.

Applicants' claim 14, as amended, recites "[t]he electronic circuit of Claim 7, wherein the data converter is a voltage-to-frequency converter."

Applicants' claim 15 recites "[t]he electronic circuit of Claim 7, wherein the data converter is a current-to-frequency converter."

Neither Williams, Preikschat nor Gord, alone or in combination, disclose nor suggest the claimed invention, including the above-quoted features.

Regarding claims 14 and 15, the Examiner recognizes that neither Williams nor Preikschat disclose various features recited therein. Accordingly, the Examiner cited the Gord patent with respect to these features. The Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teaching of Preikschat and

Gord into the circuit of Williams, for the purpose of sensing the output data as a pulse train, with a counter."

Gord discloses an implantable sensor/stimulator which is connectable to a controller using just two conductors, which two conductors carry both operating power and data (data commands and/or measured data) between the sensor/stimulator and control circuit. (See Abstract.) However, Gord does not disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1.

Because applicants' claims 14 and 15 depend directly or indirectly from claim 1, and because neither Williams, Preikschat nor Gord, alone or in combination, disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1, even if Williams could be combined with Preikschat and Gord as suggested by the Examiner, the combination would not meet the claimed invention. Thus, claims 14 and 15 would not have been obvious at the time the invention was made to a person having ordinary skill in the art. Thus, the Patent and Trademark Office has not made out a prima facie case of obviousness under the provisions of 35 U.S.C. 103(a).

In paragraph 12 of the instant Office Action claims 16 and 17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Williams, Preikschat and Gord, as applied to claim 15, and in further view of Niezgoda et al. (U.S. Patent No. 4,333,377) (hereinafter "Niezgoda").

The rejection is respectfully traversed for at least the following reasons.

Applicants' claim 16 recites "[t]he electronic circuit of Claim 15, wherein an output of the current-to-frequency converter is scaled using a prescaler before connecting to the counter."

Applicants' claim 17 recites "[t]he electronic circuit of Claim 7, wherein the circuitry further comprises

a temperature sensor for reading a temperature of an environment; and
a voltage reference for applying a voltage to a reference electrode."

Neither Williams, Preikschat, Gord nor Niezgoda, alone or in combination, disclose nor suggest the claimed invention, including the above-quoted features.

Regarding claims 16 and 17, the Examiner recognizes that neither Williams, Preikschat nor Gord disclose various features recited therein. Accordingly, the Examiner cited the Niezgoda patent with respect to these features. The Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teaching of Preikschat and Gord into the circuit of Williams, for the purpose of adjusting the (digital) signals to the capabilities of the counter."

Niezgoda discloses a tone generation system intended for use with an electronic musical instrument. The system generates digital signals capable of defining either the waveshape or the envelope or characteristic of a tone. (See Abstract.) However, Niezgoda does not disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1.

Because applicants' claims 16 and 17 depend directly or indirectly from claim 1, and because neither Williams, Preikschat, Gord nor Niezgoda, alone or in combination,

disclose or suggest "at least two electrode pairs formed on a first surface of the substrate for sensing a parameter . . . wherein the first electrode of each electrode pair wraps at least partially around the second electrode of its electrode pair", as recited in applicants' amended claim 1, even if Williams could be combined with Preikschat, Gord and Niezgoda as suggested by the Examiner, the combination would not meet the claimed invention. Thus, claims 16 and 17 would not have been obvious at the time the invention was made to a person having ordinary skill in the art. Thus, the Patent and Trademark Office has not made out a prima facie case of obviousness under the provisions of 35 U.S.C. 103(a).

The application is now considered to be in condition for allowance and an early indication of same is earnestly solicited.

Respectfully submitted,

Date: May 2, 2003

By _____

Ted R. Rittmaster
Attorney for Applicant
Registration No. 32,933

FOLEY & LARDNER
Customer Number: 23392
23392
PATENT TRADEMARK OFFICE
Telephone: (310) 975-7895
Facsimile: (310) 557-8475

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